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Knowledge, risk perception of AIDS and reported sexual behaviour among students in secondary schools and colleges in Tanzania

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Abstract

A questionnaire survey was carried out among 1041 students in secondary schools and colleges in Dar-es-Salaam, Tanzania to evaluate the relationship between HIV-risky sexual behaviour and anti-condom bias, as well as with AIDS-related information, knowledge, perceptions and attitudes. Self-reportedly, 54% of students (75% of the boys and 40% of the girls) were sexually active, 39% had a regular sexual partner and 13% had multiple partners in the previous year. The condom use rate was higher than previous reports. However, 30% of sexually active respondents did not always use condoms (Risk-1 behaviour) and 35% of those with multiple partners in the previous year did not always use condoms (Risk-2 behaviour). Multiple logistic regression analyses indicated that 'sex partner hates condom' had association with both Risk-1 behaviour (OR 2.47; 95% CI 1.58–3.85) and Risk-2 behaviour (OR 2.47; 95% CI 1.10–5.48). 'Use of condom prevents HIV infection' also had association with both Risk-1 behaviour (OR 2.09; 95% CI 1.19–3.67) and Risk-2 behaviour (OR 3.73; 95% CI 1.28–11.03). Students engaging in risky behaviour were aware of the risk, even though they failed to change their behaviour. Reasons for the AIDS epidemic among Tanzanian students and the importance of more effective AIDS education are also discussed.

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Introduction

Tanzania has reported to WHO the largest number of AIDS cases of any country in Africa. As of the end of November 1996, some 82 174 cases of AIDS (out of a population of 27 million) had been officially reported (WHO, 1996), while the Tanzanian Ministry of Health (MOH, 1996) has estimated that the number of AIDS cases was around 400 000 at the end of 1995. Furthermore, the numbers of HIV-infected people and AIDS cases in the year 2000 are anticipated to reach 1 million and 2.4 million, respectively (MOH, 1995). Lugoe (Lugoe, 1996) reported that 1.6% of the male cases and 6.0% of the female cases of a total of 31 247 AIDS cases reported to the MOH between 1987 and 1994 occurred in persons aged 15–19, and that 8.5% of the male and 21.5% of the female cases occurred in those aged 20–24. WHO (WHO, 1995) has warned that up to two-thirds of new HIV infection in many of the developing countries may be occurring in 15- to 24-year-olds and up to 60% of infection in females may be occurring by the age of 20. Adolescents in Tanzania are thus at great risk of HIV infection. The commonest way of HIV infection in Tanzania is heterosexual. Many adolescents have their sexual debut between 16 and 24 years old, and learn and consolidate alcohol drinking, cigarette smoking and disco attendance at this stage. Previous studies have shown that 60% of Tanzanian students are sexually active (Kapiga *et al*., 1991).

Sexual transmission of HIV can be prevented

by using condoms during sexual relationships, assuming that they are used correctly and consistently. Although condoms are available in Tanzania, there are many constraints on their use by Tanzanian adolescents. Many religious leaders and elders see the condom as a message promoting adolescent sexual activity, and the Tanzanian government has therefore not effectively emphasized the promotion of condom use among adolescents (The World Bank, 1992; Talle, 1995). There is no official AIDS education programme in the school curriculum in Tanzania and previous studies in Tanzania have shown that condom use is not popular enough to effectively prevent HIV infection (Kapiga *et al*., 1991; Sawaya *et al*., 1995). Very little information, however, has been documented concerning the influence on HIV-risky adolescent sexual behaviour of attitudes and opinions on condom use, as well as AIDS-related knowledge, information sources, risk perception and attitudes. We defined in this paper two risk groups according to sexual behaviour and condom use. The Risk-1 group consists of students who are sexually active and do not always use condoms. The Risk-2 group is the portion of the Risk-1 group who has had multiple sexual partners in the past year. The Risk-2 group, therefore, has higher risk of infection than the rest of the Risk-1 group. We analyzed the relationship between these risk behaviours and students' knowledge, attitude and risk perception of AIDS using multiple logistic regression analysis. Improvement of preventive and educational measures for HIV infection among Tanzanian students is discussed on the basis of the findings.

Method

Subjects

As of 1996, there were 12 secondary schools and four colleges in Dar-es-Salaam (DSM), Tanzania, attended by a total of approximately 12 000 students. We sent research proposals to all these schools and colleges, and eight secondary schools (66.7%) and two colleges (50.0%) responded positively. Four secondary schools were of the 4-year system and the other four were of the 6-year system. Forms 5 and 6 are an intermediate secondary level in preparation for advanced academic work, while Form 4 students can proceed to junior colleges without attending Forms 5 and 6. There were no clear differences in geographical distribution and social class structures differentiating the schools that accepted our proposal. The study was planned to target the eldest classes in secondary schools (Form 4 and Form 6) and the youngest classes in colleges in order to observe students in secondary schools and colleges with minimum influence caused by age differences. Because of the small number of students in Form 6, however, we eventually added two classes of Form 5 to our subjects.

A cross-sectional questionnaire survey was conducted in these eight secondary schools and two colleges in March and April 1996. The response rate, i.e. the proportion of students who participated in this study among the total of 1053 students who attended the selected class on the survey day, was 98.8%. A total of 1041 students (age range 16–24 in both sexes), 419 (40.2%) boys and 622 (59.8%) girls, completed the questionnaire. The mean ages were 19.8 years for boys and 18.3 years for girls.

The distribution of students by sex, age, class, religion and origin is shown in Table I. More than half of the students were in Form 4. Christians accounted for 69% (41% Catholic and 28% Protestant), while Muslims made up 31%. Two-thirds of the students were from cities or townships. By places of birth, subjects consisted of 303 students from DSM, 272 from the eastern region of the country, 115 from the south, 187 from the northwest and 132 from the west.

Procedure

The questionnaire survey was carried out in the classes in March and April, 1996, with permission to carry out the study previously obtained from the MOH through the National AIDS Control Programme (NACP), as well as from the Ministry of Education. The questionnaire was pre-tested in another secondary school with students of comparable age to check whether the questions would be culturally acceptable and easily understood.

Table I. *Social and demographic characteristics of students who responded to a questionnaire about AIDS*

Characteristics	No.	%
Sex		
boys	419	40.2
girls	622	59.8
Class		
Form 4	662	63.6
Form 5	160	15.4
Form 6	120	11.5
first year college	99	9.5
Religion		
Catholic	424	40.7
Protestant	293	28.2
Islam	319	30.6
tradition	5	0.5
Age (years)		
16–19	716	68.8
20–24	325	31.2
Origin		
town	692	66.5
rural	345	33.1
missing[a]	4	0.4
Region		
DSM	303	29.1
east	272	26.1
south	115	11.0
north west	187	18.0
west	132	12.7
missing[a]	32	3.1
Total	1041	100.0

[a]Missing values represent non-respondents.

Necessary changes were made to the questionnaire after the pre-test. The survey was conducted during the regular school hours after students had been asked for their voluntary participation. Students were instructed not to write their names on the questionnaire to ensure anonymity and confidentiality. They sat apart and were asked not to communicate with each other during administration of the questionnaire so as to encourage honest responses. For each class (including the pre-test), an extra hour was allocated after the survey for discussion and provision of information on AIDS in order to respond to students' concerns and to correct misconceptions. The questionnaire survey was conducted by one medical doctor (principal investigator), one medical sociologist and one counselor from the school. Survey administrators had received a 2-day training course on how to conduct the survey.

Measures

The questionnaire was developed by referring to 'Research Package: Knowledge, Attitude, Beliefs and Practices on AIDS (KABP) Phase 1' (WHO, 1990). The questionnaire was in English, which is used as the standard language in Tanzanian secondary schools and colleges. The students were first asked their socio-demographic characteristics such as age, sex, place of birth and religion. Next, they were asked sources of AIDS-related information, given a list of radio, newspaper, TV, public posters, friends, teachers, parents, health personnel, politicians and religious leaders. They were then asked true/false questions concerning knowledge of AIDS transmission (10 questions: through sexual intercourse, unsterilized needles, infected mother to child, blood transfusion, anal sex, kissing, mosquito bites, sharing clothes, breath and shaking hands) and prevention (five questions: to maintain one sexual partner, to use sterilized needles, to abstain from sexual relations, to use condoms and to prevent pregnancy in infected mothers). Knowledge for both transmission and prevention was graded according to correct answer rates; those who scored nine or 10 right answers for the 10 questions on transmission and those who scored four or five right answers for the five questions of prevention were classified as 'good'.

Students were also asked questions on awareness and perception of the risk of HIV infection, attitude to HIV-positives, and attitude to condom use. HIV was referred to as the AIDS virus in parts of this study, because this terminology, although imprecise, is popular in public AIDS education in Tanzania. Questions were also asked concerning their behaviour, such as sexual experiences, the number of sexual partners, condom use, alcohol drinking, smoking and discotheque attendance.

After showing the distribution of answers by socio-demographic characteristics on sources of information, awareness and perception of risk, knowledge, attitude toward condoms, sexual beha-

Table II. *Sources of information by sex*

Source	Boys		Girls		Total	
	No.	%	No.	%	No.	%
Radio	408/419	97.4	613/620	98.9	1021/1039	98.2
Newspaper	409/419	97.6	609/620	98.2	1018/1039	97.9
Television	366/415	88.1	546/615	88.8	912/1030	88.8
Public posters	254/413	62.0	379/601	63.1	633/1014	62.4
Religious leaders	377/419	90.0	574/618	93.0	951/1034	91.7
Politicians	163/412	39.6	263/601	43.8	426/1013	42.0
Health personnel	365/416	87.7	530/611	86.7	895/1027	87.1
Teachers	323/418	77.3	569/619	91.9	892/1037	86.0
Friends	394/419	94.0	594/621	95.7	988/1040	95.0
Parents	361/413	87.4	558/619	90.1	919/1032	89.2

viour, we calculated the unadjusted odds ratio (OR) from 2×2 tables. Multiple logistic regression analyses were conducted on 41 variables for explaining Risk-1 and Risk-2 groups by socio-demographic characteristics. Unadjusted and adjusted OR with 95% confidence intervals (95% CI) were calculated. Respondents with missing information on various items were excluded from the analyses. Statistical analysis was performed using the Statistical Analysis System (SAS Institute Inc., Cary, NC).

Results

Information sources, awareness and perception of AIDS risk

Table II shows the sources of AIDS/HIV information. Students had a variety of information sources, and most of them got information not only from mass-media such as radio, newspaper and television, but also from religious leaders, health personnel, teachers, friends and parents. Sixty-nine percent of them thought that the information provided was adequate. Most of them (95%) had discussed AIDS with other people and about two-thirds of them had discussed it with boy/girlfriends.

Table III shows their awareness, opinions and perception regarding AIDS/HIV infection. Seventy-six percent of students responded that they had heard something about AIDS and more boys had heard about it than girls (OR 10.14; 95% CI 6.86–14.99). Eighty-six percent knew at least one person who had died of AIDS and 58% knew someone with AIDS at the time of the survey. Sixty-eight percent knew that HIV-positives can appear healthy and 88% were aware of the increased risk of AIDS by having multiple sexual partners. Forty percent of students wanted AIDS education in school curriculum. Most students (99%) thought that AIDS is a very dangerous killer disease; 85% knew that AIDS could not be cured even if detected early. However, only 25% of students felt that they themselves were personally at risk of acquiring HIV and 41% thought that friends were at greater risk than themselves: these attitudes were more common in boys than in girls (OR 1.56; 95% CI 1.21–2.02). Sixty-six percent were prepared to take an AIDS test. Frequency of being prepared to take a test was greater in boys (83.9%) than girls (54.0%, OR 4.42; 95% CI 3.28–5.95). Students seemed to have a good understanding of AIDS as a social problem, but not as an issue in their personal lives.

Knowledge of HIV transmission and prevention

About 70% of the students achieved a ‘good’ score for HIV transmission and prevention (Table IV), although there were significant differences by age and class in the proportion of students with ‘good’ scores. Teenage students scored significantly lower than older students on both transmission and pre-

Table III. *Awareness, opinion and perception of risk for HIV infection and attitude*

Variables	Boys	Girls	Total
Awareness			
Have you ever heard anything about AIDS?	392/415 (94.4)[a]	385/614 (62.7)	977/1029 (75.5)
Do you know someone who has died of AIDS?	359/417 (86.0)	524/611 (85.7)	883/1028 (85.8)
Do you know someone who has AIDS?	216/416 (51.9)	378/607 (62.2)	594/1023 (58.0)
Can healthy looking person be HIV positive?	280/409 (68.4)	404/605 (66.5)	684/1014 (67.4)
Does having multiple sexual partner increase the risk of getting HIV infections?	368/413 (89.1)	528/607 (86.9)	895/1020 (87.7)
Opinion			
More information is needed on AIDS in school youth	203/419 (48.4)	217/622 (34.9)	420/1041 (40.3)
Perceived risk			
AIDS is very dangerous killer disease	407/416 (97.8)	612/617 (99.1)	1019/1033 (98.6)
AIDS is the most serious disease you have ever heard of in Tanzania?	355/413 (85.9)	550/608 (90.4)	905/1021 (88.6)
AIDS cannot be cured even if detected early	344/407 (84.5)	510/597 (85.4)	854/1004 (85.0)
Do you think you are at high risk of getting HIV infection?	110/410 (26.8)	144/596 (24.1)	254/1006 (25.2)
Do you think chances are high for your friends to get HIV infections?	193/404 (47.7)	215/582 (36.9)	408/986 (41.3)
Attitude			
Are you prepared to test HIV status of your blood?	343/409 (83.9)	321/594 (54.0)	664/1003 (66.2)

[a]Percentages are given in parentheses.

vention. Girls scored significantly lower on HIV prevention than boys. Boys in Form 4 achieved good scores more often than girls (OR 1.76; 95% CI 1.25–2.47). Teenage boys have got the poorest scores both in transmission and prevention. 'Condom use as a preventative measure' has the lowest correct answer rate (77%) among the questions. Student's attitudes toward condom use are summarized in Table V. Many students had an anti-condom bias, believing that condoms reduce the sensation of romantic sex (66%), that condoms are not safe (51%), that condoms can bring disease (48%) and that their sexual partner hates condoms (37%). The percentages of boys who affirmed that condoms are dangerous in slipping out during use and remaining in the vagina were higher in Form 5 and over than in Form 4 (OR 4.48; 95% CI 2.47–8.13). The number of boys who affirmed that condoms could bring disease was greater in Form 5 and over than Form 4 (OR 1.97; 95% CI 1.32–2.95). The number of girls who thought that condoms could bring disease was greater in Form 5 and over than Form 4 (OR 1.98; 95% CI 1.37–2.87). Older students tended to stigmatize condoms more than younger students. There were no large differences in attitude against condoms between sexually active and non-active students. However, as noted subsequently, risk-taking sexual behaviour was related strongly to anti-condom attitudes.

Sexual activities

The average age of sexual debut was 15.5 years for boys and 15.8 years for girls. Overall, 544 students (54.0%) reported that they were sexually

Table IV. *Unadjusted OR for knowledge on AIDS virus transmission and prevention by demographic characteristics: percentage of those who marked in score of 'good'*

Characteristics	Transmission		Prevention	
	No. (%)[a]	Unadjusted OR (95% CI)	No. (%)	Unadjusted OR (95% CI)
Age (years)				
16–19	496/716 (69.3)		482/716 (67.3)	
20–24	254/325 (78.2)	1.59 (1.17–2.16)	254/325 (78.2)	1.74 (1.28–2.35)
Sex				
boys	297/419 (70.9)		311/419 (74.2)	
girls	453/622 (72.8)	1.10 (0.84–1.45)	425/622 (68.3)	0.75 (0.57–0.99)
Class				
Form 4	437/662 (66.0)		434/662 (65.6)	
Form 5 + 6	233/280 (83.2)	2.55 (1.81–3.60)	220/280 (78.6)	1.92 (1.39–2.67)
college	80/99 (80.8)	2.16 (1.29–3.63)	82/99 (82.8)	2.53 (1.49–4.31)
Age–sex				
boys				
16–19	120/197 (60.9)		132/197 (67.0)	
20–24	177/222 (79.7)	2.52 (1.64–3.88)	179/222 (80.6)	2.05 (1.32–3.19)
girls				
16–19	376/519 (72.4)		350/519 (67.4)	
20–24	77/103 (74.8)	1.13 (0.69–1.83)	75/103 (72.8)	1.29 (0.81–2.07)
Total	750/1041 (72.0)		736/1041 (70.7)	

[a]Percentages are given in parentheses.

Table V. *Number (%)[a] of variables on attitude toward condoms*

Variables	Boys	Girls	Total
They reduce the sensation of romantic sex	281/382 (73.5)	298/490 (60.8)	579/872 (66.3)
They are not safe	178/411 (43.3)	333/598 (55.6)	511/1009 (50.6)
They can bring disease	161/411 (39.1)	331/607 (54.5)	492/1018 (48.3)
My sexual partner hates condoms	132/329 (40.1)	116/339 (34.2)	248/668 (37.1)
They are dangerous if they slip out during use and remain in the vagina	332/405 (81.9)	507/585 (86.6)	839/990 (84.7)
They are expensive	79/399 (19.7)	86/564 (15.2)	165/963 (17.1)
They are not easily available	70/398 (17.5)	113/547 (20.6)	183/945 (19.3)

[a]Percentages are given in parentheses.

active (Table VI) and boys were (self-reportedly) more active than girls (75.0 versus 40.0%; OR 4.45; 95% CI 3.42–5.80). Students aged 20 and over were more sexually active than the others (70 versus 44%; OR 3.04; 95% CI 2.31–3.99). The proportion of sexually active boys increased with class in high schools, although that in the first year of college did not differ substantially from Form 6.

Table VI. *Sexually active students among classes*

Class	Boys	Girls	Total
Form 4	132/212 (62.2)[a]	157/450 (34.8)	289/662 (43.3)
Form 5	47/62 (75.8)	47/98 (47.9)	94/160 (58.7)
Form 6	46/53 (86.7)	32/67 (48.5)	78/120 (65.5)
First year college	82/92 (89.1)	1/7 (14.3)	83/99 (83.8)
Total	307/419 (75.0)	237/622 (40.0)	544/1041 (54.0)

[a]Percentages are given in parentheses

A total of 403 students (39%), 56% of boys and 27% of girls, reported that they had regular sexual relationships at the time of the study. Among them, 78 students (7%), 13% of boys and 4% of girls, had multiple partners. Boys who had sexual partner(s) at the time of the survey increased with class from 47% in Form 4, 60% in Forms 5 and 6, to 61% in college. This tendency was not observed for girls (25% in Form 4, and 19% in Forms 5 and 6). Percentages of students with multiple sexual partners (as compared to all respondents) by class were more or less constant in the ranges of 12–14% for boys and 3–4% for girls. During the past year, 497 students (48%), 297 boys (71% of all boys or 97% of the sexually active boys) and 200 girls (32% of all girls or 84% of the sexually active girls), had sexual relations. One hundred and thirty-one students (13%), 81 boys (19% of all boys or 26% of sexually active boys) and 50 girls (8% of all girls or 21% of sexually active girls), had sex with multiple partners. One hundred and sixty-nine boys (40%) and 131 girls (21%) reported having sex once per week, while 58 boys (14%) and 35 girls (6%) had sex twice or more per week.

Risky sexual behaviour

Forty-six percent of the sexually active students, 53% of sexually active boys and 36% of sexually active girls, answered that they always use condoms during sex. Meanwhile, one-third of the sexually active girls and 16% of the sexually active boys avoided responding to this question. Those who indicated that they were taking Risk-1 behaviour (sexually active but do not always use condoms) were 168, 16% of all students or 30% of the sexually active students. Boys took Risk-1 behaviour to a greater extent than girls (23 versus 12%, OR 2.20; 95% CI 1.57–3.08). However, the actual percentage of Risk-1 behaviour may be greater than indicated here, because 24% of the sexually active students (12% of all respondents) skipped the question.

The majority (62%) among students who had multiple sex partners in the past year reported that they always use condoms in these relationships. Those who were sexually active had multiple sex partners and did not always use condoms in the past year (Risk-2 behaviour) totaled 47, 4.5% of all students or 8.6% of sexually active students). They were 24 boys (6% of all boys or 8% of the sexually active boys) and 23 girls (4% of all girls and 10% of the sexually active girls).

Results of multiple logistic regression analyses

The results shown in Table VII demonstrate OR and 95% CI of variables associated with Risk-1 behaviour. The Risk-1 behaviour was significantly independently associated with sex (boys had OR of 1.79 to girls, 95% CI 1.09–2.94) and origin (students from rural areas had OR of 1.61, compared to those from urban area with 95% CI 1.02–2.52). Getting information from friends was positively associated with Risk-1 behaviour (OR 4.98; 95% CI 1.15–21.58). Associated with the Risk-1 behaviour among anti-condom bias was 'My sexual partner hates condoms' (OR 2.47; 95% CI 1.58–3.85) and 'Use of condom during sex intercourse helps to prevent HIV transmission' (OR 2.09; 95% CI 1.19–3.67). The same model was used to investigate the relationship between variables and Risk-2 behaviour (Table VIII). The following eight variables were significantly independently associated with Risk-2 behaviour; Form 5 against Form 4 (OR 1.85; 95% CI 1.11–3.08), 'I am at high risk of getting HIV infection' (OR 2.80; 95% CI 1.19–6.56), drinking alcohol (OR

Table VII. *Unadjusted and adjusted OR with 95% CI of variables associated with Risk-1 behaviour*

Characteristics	No.[a]	Unadjusted OR	Adjusted OR (95% CI)[b]
Age (20–24/16–19)	68 of 325/100 of 716	1.09	1.09 (0.61–1.96)
Sex (boys/girls)	95 of 419/73 of 622	2.20	1.79 (1.09–2.94)
Class			
(Form 5/Form 4)	22 of 160/99 of 662	0.96	1.17 (0.89–1.54)
(Form 6/Form 4)	24 of 120/99 of 662	1.44	
(first year college/Form 4)	23 of 99/99 of 662	1.63	
Religion			
(Protestant/Catholic)	37 of 293/76 of 424	0.66	0.84 (0.48–1.46)
(Islam/Catholic)	52 of 319/76 of 424	0.89	0.77 (0.46–1.30)
(Traditional/Catholic)	3 of 5/76 of 424	–	–
Origin (rural/urban)	63 of 345/105 of 692	1.24	1.61 (1.02–2.52)
Transmission knowledge (good/poor score)	134 of 750/34 of 291	1.64	1.72 (0.99–2.98)
Prevention knowledge (good/poor score)	122 of 736/6 of 18	1.11	0.98 (0.57-.1.65)
Getting information from radio (yes/no)	162 of 1021/6 of 18	0.37	0.25 (0.06–1.06)
Getting information from newspaper (yes/no)	162 of 1018/6 of 21	0.47	0.57 (0.11–2.87)
Getting information from TV (yes/no)	147 of 912/20 of 118	0.94	0.85 (0.44–1.62)
Getting information from posters (yes/no)	99 of 633/67 of 381	0.86	0.68 (0.42–1.11)
Getting information from religious leaders (yes/no)	148 of 951/20 of 86	0.60	0.65 (0.31–1.37)
Getting information from politicians (yes/no)	70 of 426/96 of 587	1.00	1.40 (0.88–2.22)
Getting information from health personnel (yes/no)	145 of 895/22 of 132	0.96	1.06 (0.52–2.16)
Getting information from teachers (yes/no)	137 of 892/31 of 145	0.66	0.83 (0.45–1.54)
Getting information from friends (yes/no)	161 of 988/7 of 52	1.25	4.98 (1.15–21.58)
Getting information from parents (yes/no)	146 of 919/21 of 113	0.82	1.14 (0.56–2.34)
AIDS is a very dangerous killer disease? (yes/no)	165 of 1019/3 of 14	–	–
Are you at high risk of getting HIV infections? (yes/no)	50 of 254/114 of 752	1.37	1.67 (0.97–2.89)
Condoms are dangerous (yes/no)	143 of 839/23 of 151	1.14	1.29 (0.70–2.43)
Condoms are expensive (yes/no)	26 of 165/139 of 798	0.88	0.75 (0.42–1.34)
Condoms are not safe (yes/no)	85 of 511/78 of 498	1.07	1.29 (0.79–2.10)
Condoms can bring disease (yes/no)	82 of 492/84 of 526	1.05	0.91 (0.56–1.51)
My sexual partner hates condom (yes/no)	72 of 248/74 of 420	1.91	2.47 (1.58–3.85)
Do you smoke cigarettes? (yes/no)	13 of 44/154 of 954	2.17	1.42 (0.60–3.56)
Do you drink alcohol? (yes/no)	27 of 109/139 of 890	1.77	1.37 (0.73–2.57)
Are your friends at high risk to get HIV infections? (yes/no)	67 of 408/95 of 578	0.99	0.63 (0.38–1.04)
Are you prepared to test the HIV status of your blood? (yes/no)	102 of 564/65 of 439	1.27	1.30 (0.83–2.05)
Do you know someone who has died of AIDS? (yes/no)	143 of 883/25 of 145	0.92	0.95 (0.50–1.81)
Do you attend discotheques? (yes/no)	51 of 257/110 of 713	1.34	1.00 (0.61–1.63)
I can visit a friend who has AIDS (yes/no)	126 of 775/40 of 244	0.99	0.89 (0.51–1.55)
I can be a friend with an AIDS person (yes/no)	91 of 552/71 of 453	1.14	0.88 (0.55–1.42)
I can take care of an AIDS person without worries (yes/no)	145 of 855/22 of 160	1.28	1.58 (0.79–3.16)
Stick to one sex partner (yes/no)	57 of 370/111 of 671	0.51	0.78 (0.47–1.28)
More information is needed on AIDS in school youth (yes/no)	77 of 420/91 of 621	1.30	0.99 (0.61–1.62)
Use of condom during sex prevents HIV infection (no/yes)	140 of 816/28 of 225	1.45	2.09 (1.19–3.67)
Create jobs for jobless youth (yes/no)	0 of 25/168 of 1016	–	–
Condoms are HIV infested, avoid using them (yes/no)	12 of 98/156 of 943	0.70	1.27 (0.53–3.02)
Take HIV test before marriage (yes/no)	4 of 29/164 of 1012	–	–
Delay sexual life before marriage (yes/no)	14 of 89/154 of 952	0.97	1.28 (0.59–2.79)
Isolation of AIDS people (yes/no)	1 of 7/167 of 1034	–	–

[a]Total cases do not add up to 1041 due to missing responses to individual questions.
[b]Adjusted OR were calculated on 683 students with complete answers, adjusting for variables listed in the table.
A dash indicates that the OR was not provided in this table because of the small number (less than 5) in the 2×2 table.

Table VIII. *Unadjusted and adjusted OR with 95% CI of variables associated with Risk-2 behaviour*

Characteristics	No.[a]	Unadjusted OR	Adjusted OR (95% CI)[b]
Age (20–24/16–19)	18 of 325/29 of 716	1.38	1.22 (0.50–2.96)
Sex (boys/girls)	24 of 419/23 of 622	1.58	1.46 (0.64–3.32)
Class			
(Form 5/Form 4)	7 of 160/33 of 662	0.87	1.85 (1.11–3.08)
(Form 6/Form 4)	3 of 120/33 of 662	–	
(first year college/Form 4)	4 of 99/33 of 662	–	
Religion			
(Protestant/Catholic)	11 of 293/20 of 424	0.79	1.63 (0.62–4.27)
(Islam/Catholic)	16 of 319/20 of 424	1.07	1.09 (0.44–2.12)
(Traditional/Catholic)	0 of 5/20 of 424	–	–
Origin (rural/urban)	17 of 345/30 of 692	1.14	1.87 (0.85–4.09)
Transmission knowledge (good/poor score)	35 of 750/12 of 291	1.13	1.98 (0.79–4.93)
Prevention knowledge (good/poor score)	33 of 736/14 of 305	0.97	1.48 (0.62–3.49)
Getting information from radio (yes/no)	46 of 1021/1 of 18	–	–
Getting information from newspaper (yes/no)	46 of 1018/1 of 21	–	–
Getting information from TV (yes/no)	39 of 912/8 of 118	0.61	0.54 (0.21–1.43)
Getting information from posters (yes/no)	25 of 633/21 of 381	0.70	0.82 (0.36–1.90)
Getting information from religious leaders (yes/no)	41 of 951/6 of 86	0.60	0.83 (0.24–2.85)
Getting information from politicians (yes/no)	20 of 426/27 of 587	1.02	1.26 (0.57–2.75)
Getting information from health personnel (yes/no)	38 of 895/9 of 132	0.60	0.62 (0.22–1.81)
Getting information from teachers (yes/no)	41 of 892/6 of 145	1.11	2.82 (0.85–9.36)
Getting information from friends (yes/no)	45 of 988/2 of 52	–	–
Getting information from parents (yes/no)	37 of 919/10 of 113	0.43	0.39 (0.15–0.99)
AIDS is a very dangerous killer disease? (yes/no)	46 of 1019/1 of 14	–	–
Are you at high risk of getting HIV infections? (yes/no)	24 of 254/23 of 752	1.65	2.80 (1.19–6.56)
Condoms are dangerous (yes/no)	28 of 839/9 of 151	0.75	0.97 (0.38–2.50)
Condoms are expensive (yes/no)	9 of 165/38 of 798	1.15	0.54 (0.20–1.47)
Condoms are not safe (yes/no)	24 of 511/22 of 498	1.07	1.15 (0.51–2.58)
Condoms can bring disease (yes/no)	23 of 492/24 of 526	1.02	0.74 (0.32–1.76)
My sexual partner hates condom (yes/no)	19 of 248/24 of 420	1.36	2.47 (1.10–5.48)
Do you smoke cigarettes? (yes/no)	10 of 44/32 of 954	7.28	2.99 (0.94–9.54)
Do you drink alcohol? (yes/no)	15 of 109/32 of 890	4.27	4.15 (1.60–10.79)
Are your friends at high risk to get HIV infections? (yes/no)	25 of 408/22 of 578	1.65	1.09 (0.49–2.44)
Are you prepared to test the HIV status of your blood? (yes/no)	18 of 564/29 of 439	0.46	0.29 (0.14–0.62)
Do you know someone who has died of AIDS? (yes/no)	42 of 883/5 of 145	1.39	1.64 (0.53–6.11)
Do you attend discotheques? (yes/no)	20 of 257/27 of 713	2.14	0.88 (0.39–2.03)
I can visit a friend who has AIDS (yes/no)	32 of 775/15 of 244	0.65	0.56 (0.23–1.35)
I can be a friend with an AIDS person (yes/no)	24 of 552/23 of 453	0.85	0.49 (0.22–1.11)
I can take care of an AIDS person without worries (yes/no)	41 of 855/6 of 160	1.29	3.33 (1.00–11.05)
Stick to one sex partner (yes/no)	14 of 370/33 of 671	0.76	0.89 (0.37–2.14)
More information is needed on AIDS in school youth (yes/no)	24 of 420/23 of 621	1.57	0.61 (0.27–1.37)
Use of condom during sex prevents HIV infection (no/yes)	41 of 816/6 of 225	1.88	3.73 (1.26–11.03)
Create jobs for jobless youth (yes/no)	1 of 25/46 of 1016	–	–
Condoms are HIV infested, avoid using them (yes/no)	4 of 98/43 of 943	–	–
Take HIV test before marriage (yes/no)	2 of 29/45 of 1012	–	–
Delay sexual life before marriage (yes/no)	2 of 89/45 of 952	–	–
Isolation of AIDS people (yes/no)	0 of 7/47 of 1034	–	–

[a]Total cases do not add up to 1041 due to missing responses to individual questions.
[b]Adjusted OR were calculated on 683 students with complete answers, adjusting for variables listed in the table.
A dash indicates that the OR was not provided in this table because of the small number (less than 5) in the 2×2 table.

4.15; 95% CI 1.60–10.79), 'My sexual partner hates condoms' (OR 2.47; 95% CI 1.10–5.48), 'I can take care of AIDS person without worries' (OR 3.33; 95% CI 1.00–11.05) and 'Use of condom during sex intercourse helps to prevent HIV transmission' (OR 1.26; 95% CI 1.26–11.03). The following two variables were negatively associated with the Risk-2 behaviour 'getting information from parents' (OR 0.39; 95% CI 0.15–0.99) and 'I am prepared to test HIV status' (OR 0.29; 95% CI 0.14–0.62).

Discussion

Most students had information on AIDS through mass media, and through communication with friends, parents, teachers, religious leaders and health personnel. This is an encouraging finding in terms of continuing the promotion of AIDS education through radio, newspaper, television and personal/group communication. Personal communication is generally encouraging in the absence of a formal AIDS education programme in the school curriculum, but such communication may also be a source of misinformation, prejudice and myth (Lule and Gruer, 1991; Pattullo *et al*., 1994). In the present study, those getting information from friends were engaging in Risk-1 behaviour more than others, and there is a need to find out what quality of information is being passed through communication with friends. There is still prejudice against people who have contracted AIDS; 16% answered that they could not take care of an AIDS patient without worries and 50% could not be a friend to a person with AIDS. On the other hand, those getting information from parents were engaging in Risk-2 behaviour less than others. Introduction of proper AIDS education in the school curriculum will minimize misconceptions and prejudice, and encourage communication with parents. Involving people who are living with HIV/AIDS in school AIDS education, as successfully done in developed countries (Carballo *et al*., 1995; Sapa-AP, 1996), would be helpful for students to more deeply understand people who are living with HIV/AIDS.

Students had a high knowledge of HIV transmission and prevention in general. However, the knowledge of teenage students and girls was lower than that of the older ones and boys. Kapiga *et al*. (Kapiga *et al*., 1991) reported that girls were less likely to be informed from the mass media than boys due to the Tanzanian socio-cultural context, although the results of the present study did not confirm this. Introducing AIDS education in the lower grades of schools and paying special attention to girls will be effective.

There was a discrepancy between knowledge of HIV infection and behaviour. Students with good knowledge concerning HIV transmission tended to engage in Risk-1 behaviour. Those taking Risk-1 and/or Risk-2 behaviour appear to generally understand that they are at high risk of getting HIV infection.

Important findings of the present study are the existence of strong prejudice against condom use and the relation of this prejudice with risk-taking sexual behaviour of students. About half of the students felt that condoms are not safe and that condoms can bring disease, and two-thirds felt that condoms reduce the sensation of romantic sex. Many young bar workers in northern Tanzania believed that condoms are HIV infested and expressed fear of using them (Talle *et al*., 1995). This may be attributed to rumours circulating in the local press that the condoms on the markets, especially those made in US, are infested with HIV.

Partners' anti-condom bias ('My sexual partner hates condom') was associated with both Risk-1 and Risk-2 behaviours. It is not clear whether partners actually hate condoms or whether respondents are merely supposing that their partners would feel this way. In both cases, better information and education on condoms through proper sources would reduce anti-condom bias. Such bias can only be effectively modified if the government promotes condoms in a much more active way (Lule and Gruer, 1991).

In this study 54% of students (75% of boys and 40% of girls) were reportedly sexually active. The rate of sexually active students is not much different from previous reports [61% by Kapiga *et al*.

(Kapiga *et al*., 1991) and 62% by Lugoe *et al*. (Lugoe *et al*., 1996)]. The proportions of condom use, 53% of sexually active boys and 36% of sexually active girls, however, were higher in the present study than the previous ones (4 and 22%, respectively). Nevertheless, 16% of all students, or 30% of the sexually actives, answered that they do not always use condoms (Risk-1 behaviour), and 4.5% of all students, or 35% of students with multiple partners in the previous year were involved in sexual relationships without always using condoms (Risk-2 behaviour). There is need to convince these students that the risk of HIV infection exists in a personal sense and the need to protect themselves is very important.

Alcohol drinking, associated with Risk-2 behaviour, should also be considered in future AIDS educational programmes. Drinking alcohol, smoking cigarettes and attending discos were positively associated with sexual activities in northern Tanzania (Lugoe *et al*., 1995). Adolescents in Massachusetts who drink alcohol and use drugs were less likely to use condoms (Hingson *et al*., 1990). Health education in schools should therefore provide particular focus on those who are engaging in such behaviour.

One-quarter of the students thought that they were at risk of HIV infection and they were more likely to engage in Risk-2 behaviour. Those who were prepared to test their HIV status were less likely to engage in Risk-2 behaviour. The results of the present study suggest that there are two kinds of students with respect to AIDS risk. Students of one group are not involved in risky sex and relatively free from HIV infection. Students of the other group are involved in risky sex, though they are aware both of their risk and the usefulness of condoms for AIDS prevention. They are receiving misconceptions from their friends and tending to strongly dislike condom use, as well as drinking alcohol and fearing to take the HIV test. They also report that they could take care of people with AIDS without worries. Nevertheless, those who do not know much about AIDS and continue to have risky sex may be decreasing. The present study showed that the number of the first group is increasing, although there is still a considerable number of students of the latter group.

The contents and methods of health education for these two groups should be different. For the first group, the purpose is to prevent them from being involved in risky sex by giving accurate knowledge on concerning romantic love, HIV infection and AIDS, and safe sex. Health educators could impact knowledge on a variety of safe-sex topics, teaching students that there are other, safe ways for gaining the pleasure of romantic love. With these skills, students would be better equipped to cope with the different types of risk situations they may encounter. At the same time, it is important to let them think of people with HIV/AIDS as members of their own society to eliminate discrimination. This can be accomplished both through mass education and group discussion in class. For the latter group who were already involved in risky sex, information disseminated through the mass media and mass education may not be sufficient to change their attitudes and behaviour. Education aimed at giving more knowledge would seem to be of least use for them, and their education should be focused more on changing their behaviour and attitudes. Condom use may be more effectively promoted by means of face-to-face discussion and focus group discussion in school programmes. HIV tests, counseling based on the results of the tests and follow-up small group discussion/learning with health education specialists may be effective.

The social norms prohibiting sexual activities among adolescents seemed to be less effective than previously. These norms are less influential because of modernization processes (religion, education, economy, culture, politics, etc.). In much of Tanzanian societies, the teaching of sexual knowledge and skills to young people is regarded as a sensitive issue/immoral, religiously, politically, morally and socially. As a result, children grow to adolescence and into young adulthood without being given any systematic training in these matters (Heguye, 1995). In the absence of such training, adolescents such as the subjects in this study get their know-

ledge on sexual issues mainly through mass media, 'rumours' true or false and discussion with friends.

Although the students surveyed may not necessarily be representative of all the Tanzanian adolescents, they do represent an important subgroup of Tanzanians who may be putting themselves at risk of HIV infection through risky sexual behaviour.

In summary, considerable risk-taking sexual behaviour without condoms was found and such risky behaviour was related to prejudice against condoms. Furthermore, the risk appeared to be perceived by the risk-takers. AIDS education programmes in schools, involving close communication with teachers, classmates, health educators and parents, would tend to reduce risky sex among students who are perceptive of their own risk.

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